

Health and Dietary Supplements

Lambrini Kourkouta, Christos Iliadis, Ekaterina Frantzana, Alexandros Monios, Alexandra Dimitriadou, Ioanna V. Papathanassiou

Abstract— Introduction: Nutritional supplements provide nutrients, which may not ingest in sufficient quantities. Dietary supplements may be vitamins, minerals, amino acids, fatty acids or other substances, and are present in the form of pills, tablets, capsules and liquids.

Purpose: The purpose of this review is to present the correlation of nutritional supplements to the human body through food, in order to protect and promote health.

Review Methods: The methodology of this study included search of review studies and research in leading databases such as PUBMED, MEDLINE and IATROTEK. The criterion for the selection of the articles was the Greek and English language, with keywords: nutrition, food supplements, health.

Results: It is true that today our diet is much richer than before. On the other hand, the abundance of processed food and ignorance of the basic principles of nutrition have led much of the population to an unbalanced diet. Thus, the phenomenon of a very rich food in calories and fat and poor in proteins, vitamins and minerals. So sometimes recommend the consumption of food supplements to meet these human needs. Nutritional supplements help in improving performance, physical appearance, to avoid making dangerous drugs and meet the increased needs of the organization or deficiencies in nutrients caused by and which cannot be met by normal diet.

Conclusions: Consumption of food supplements should be done in moderation because their excess consumption can cause various side effects in the person's body.

Index Terms— nutrition, food supplements, health.

I. INTRODUCTION

Nowadays, diet is thought to be much richer than it used to be. However, the abundance of food industry and people's ignorance of the basic principles of nutrition has led a large part of the population to a non-balanced diet which is rich both in calories and fat and low in proteins, vitamins and minerals [1].

This long-term situation leads to the emergence of various degenerative diseases. At this point, nutritional supplements come to give solution to the problem [2].

As dietary supplements are defined the products that contain one or more concentrated nutrients whose goal is to supplement the individual's daily diet, when his diet is not balanced and does not belong to the category of common food, is not medicine in accordance with the applicable

Lambrini Kourkouta, Professor, Nursing Department, Alexander Technological Educational Institute of Thessaloniki, Greece, Alexander Technological Educational Institute of Thessaloniki, Greece Phone: +302310013500

Christos Iliadis, RN, Nursing Department, Alexander Technological Educational Institute of Thessaloniki, Greece

Ekaterina Frantzana, Biologist, Professor of 7th High School of Athens, Greece.

Alexandros Monios, Associate Professor, Nursing Department, Alexander Technological Educational Institute of Thessaloniki, Greece.

Alexandra Dimitriadou, Assistant Professor, Nursing Department, Technological Educational Institute of Thessaly, Greece.

Ioanna V. Papathanassiou

provisions on medicinal products or special diet products and is not intended for specific categories of people [3].

Supplements offer the missing ingredients to the body in order the latter to be kept in good physical and mental condition. Thus, the human organism is not exhausted and, at the same time, injuries and fatigue are avoided [4].

Dietary supplements have been multiplied during the last decades. They are made in the form of tablets or powder. Their consumption is also on the increase. Individuals who receive systematically dietary supplements ought to know that they may take more vitamins and other nutrients than their organism is able to tolerate. As a result, there are health risks due to excessive consumption quantities of dietary supplements. The problem becomes more serious because people can receive these supplements by themselves, without a prescription and medical supervision [5].

The purpose of this review project is the presentation of the correlation between nutritional supplements and the human organism. It is aimed at health protection and promotion.

Medical and nursing journals and books were searched via electronic databases MEDLINE, IATROTEK and their respective libraries. The key words used were: nutrition, dietary supplements, health.

II. CLASSIFICATION OF DIETARY SUPPLEMENTS

In accordance with the legislation, the labeling of these substances should include [6]:

- Declaration that it is a dietary supplement after the name of the product
- The recommended dose of the product for daily consumption
- The statement that the supplements do not replace a balanced and varied diet.
- Statement about the storage of the product away from children

According to National Agency of Medicines, dietary supplements are divided into two categories depending on their intended use [7]:

1. Food supplements as food products. They supplement the usual diet.
2. Foodstuffs for particular nutritional uses as a beverage, which due to its special composition, are intended for special diet of certain population groups e.g. for healthy infants or children between the ages of two and five, for special categories of persons with disordered metabolism, or for categories of persons who are in a special physiological condition.

The supplements also can be distinguished, depending on the origin: supplements of natural or synthetic origin.

They are classified comparably to their texture or form in which they are available as follows [8]:

- Vitamin and mineral supplements, whether they are combined in the form of multivitamins or multiminerals or not.
- Protein supplements in the form of liquid or tablet in combination or not with carbohydrates, fats, vitamins and minerals.
- Amino acids of every form and composition.
- Supplements for gaining weight
- Meal surrogates in the form of powder, wafers or biscuits.
- Carbohydrate supplements with or without electrolytes and vitamins.
- Supplements which have natural anabolic effect and which are not included in the "banned substances".
- "Activator" supplements of growth hormone and other hormones.
- Supplements of basic fatty acids.
- Foodstuffs or food ingredients such as yeast, garlic, kelp, royal jelly.
- Herbs.

There are thousands of supplements in the market. Many of them are very good, other moderate or some of them provide very little. The main reason for their low efficiency is their manufacturing method and the source of their basic substances [9].

III. FORMS OF DIETARY SUPPLEMENTS

Food supplements are in various packages, sizes and types, depending on how they are taken. There are tablets, capsules, powders, oral ampoules, effervescent tablets, chocolate, mastic which is available whether in syrup form or not. More specifically, the ways of taking food supplements are the following [10, 11]:

- Oral pills, powders, for relatively quick absorption
- Sublingual drops, oral disintegrated tablets, to increase their intake and limit the damage of their active substance
- Nose spray or drops to over multiply their absorption.
- Injectables as intramuscular injections for quick absorption and action
- Bone anchored for slow and gradual absorption and prolonged action.

Some supplements are not well absorbed, some are almost completely destroyed by the stomach fluids and other irritate the mucosa of the stomach and intestine. Powders and liquid preparations are useful for those who have difficulty, for psychological or other reasons, to swallow the capsules or tablets. If the problem is psychological, it can be solved, when simultaneously with the pill intake, the athlete will drink water in a special way. Supplements in the form of sprays cause intense local irritation or possible lung aspiration.

Injecting supplement is always done under the guidance of a physician. Regarding bone anchored supplements, due to surgical technique, require monitoring and laboratory control to prevent local inflammations and complications [12].

If there is intense change in color of urine by taking a supplement, then, a large portion of the supplement is excreted either because it cannot be absorbed, or it is overdosed. This must lead to reflections on its effectiveness [13].

IV. ADVANTAGES-DISADVANTAGES OF DIETARY SUPPLEMENTS

The advantages that nutritional supplements generally offer are as follows [14]:

- High content of nutrients in small volume
 - Special nutrient composition.
 - Lack of undesirable accompanying substances such as fats, cholesterol and purines
 - Offer complete coverage of specialized sporting needs
- Nevertheless, these formulations should be treated as a supplement of basic healthy diet and not as a replacement. Users of dietary supplements often increase the dosage or frequency. As a result, doses become less and less effective. Thus, the human organism is forced to work harder to eliminate the extra amounts of these [15].

All these factors lead to the appearance of side effects due to toxicity of dietary supplements, which depends on the following factors [16]:

- The dosage because the exceeding of the recommended dosage may cause side effects
- The duration of substance intake. That is due to the fact that the human organism is overloaded, owing to specific substances that the supplement contains, till the substance is eliminated.
- The special chemical properties of some substances and their interactions with other food and substances
- Person's weight who takes those supplements
- Age, because lots of supplements are not recommended for underage persons or the elderly.
- The individual capacity because each person reacts differently in the face of various substances

No supplement is innocent. For instance, some overdose of fat-soluble vitamins causes hypervitaminosis. Protein overdose damages kidneys and the liver. A lot of carbohydrate intake in the form of powder can cause fat increase. A large dose of fatty acids may lead to some inability of the organism to form some muscle proteins. Last but not least, performance-enhancing drugs may cause endocrine disorders [17].

V. CONCLUSION

Individuals who systematically take dietary supplements ought to be informed that they might take more nutrients than their organism is able to tolerate. Upper tolerable levels are those, which if the concentration of the substance is exceeded, then, side effects and toxicity start to appear to the human organism. People may not be aware that there are risks that may arise from those formulations. So, they often consume excessive amounts [18].

The problem becomes more serious for, they can receive these substances by themselves, without a prescription and medical supervision [19].

Therefore, users of nutritional supplements have to read carefully the labels on supplements and enriched foods and avoid taking multiple doses that exceed the Recommended Dietary benefits (RDAs) [20, 21]. In cases of doubt, people should seek the advice of a specialist before they choose a dietary supplement

REFERENCES

- [1] European Commission. Food supplements section <http://ec.europa.eu/food/food/labellingnutrition/supplements/>
- [2] Oikonomou N. D. The effect of supplementation of antioxidants vitamins C & E in antioxidant capacity of young men. Department of Physical Education and Sports Science. University of Thessaly, 2009.
- [3] Strengthening the immune and antioxidant defense: vitamins, minerals,
- [4] antioxidants and others. <http://www.nutrinews.gr/>
- [5] Beitz R., Mensink G.B., Rams S., Döring A. Vitamin- und Mineralstoffsupplementierung in Deutschland (Use of vitamin and mineral supplements in Germany). Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz 2004, 47:1057–1065.
- [6] The European project website EURRECA: www.eurreca.org
- [7] Analyses by EUFIC. Dietary guidelines based food in Europe, 2009.
- [8] EOF - placing food supplements and foods for particular nutritional, 07/12/2004.
- [9] Rovira M.A., Grau M., Castañer O., Covas M.I., Schroder H. Dietary supplement use and health-related behaviors in a Mediterranean population. Journal of Nutrition Education and Behavior 2013 45(5):386-391.
- [10] The role of dietary supplements. Available in <http://www.iatronet.gr>. Posted on 10/06/2016.
- [11] ADA. (2001). Dietary Guidelines. Department of Agriculture & Health and Human Resources, 2000.
- [12] Sousa M, (2013). Nutritional supplements usage by Portuguese athletes. Int J Nutr Res Vitam 83 (1): 48-58.
- [13] Mulholland CA, B. D. (2007). What is known about the safety of multivitamin - multimineral supplements for the generally healthy population? Theoretical basis for harm. Am J Clin Nutr 85(1):318 -322.
- [14] Troppmann L. Supplement use: is there any nutritional benefit? J Am Diet Assoc 2002 102(6):818-825.
- [15] Thomas B. Manual of Dietetic Practice. 3rd Edition. Blackwell, 2001.
- [16] Oikonomou N. D. The effect of supplementation of antioxidants vitamins C & E in antioxidant capacity of young men. Department of Physical Education and Sports Science. University of Thessaly, 2009
- [17] Troesch B. Dietary surveys indicate vitamin intakes below recommendations are common in representative Western countries. British Journal of Nutrition 2012 108(4):692-8.
- [18] Kittaros A., Sotiriadou S., Tsaloglidou A., Matsiari X., Ambatsidis G. Vitamin E: Structure and mechanism of action. Galen 2014 46 (6): 626-643.
- [19] Monios A., Tsaloglidou A., Koukourikos K., Dimitriadou A., Iliadis Ch., Kourkouta L. The Effects of Vitamin E and Exercise on Muscle. International Journal of Health Administration and Education Congress. Full Text Part. Gebze, Turkey in 26-27 March 2016, 229-231.
- [20] Kourkouta L., Rarra A., Ambrahim S.E. The diet of children in school age. Scientific Annals 2013 18 (2): 78 -82.
- [21] Mensink G.B, Fletcher R., Gurinovic M., Huybrechts I, Lafay L., Serra-Majem L., Szponar L., Tetens I., Verkaik-Kloosterman J., Baka A., Stephen A. M. Mapping low intake of micronutrients across Europe. British Journal of Nutrition 2012 114:1-19.
- [22] Tsaousoglou A., Koukourikos K. Quality and service health. Stigma 2007, 15(2): 18-24.